

**Bay Area Air Quality Management District**

**939 Ellis Street  
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**Proposed Amendments to  
BAAQMD Regulation 8, Rule 51:  
Adhesive And Sealant Products**

**Staff Report**

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# **STAFF REPORT**

## **REGULATION 8, RULE 51**

### **ADHESIVE AND SEALANT PRODUCTS**

#### **EXECUTIVE SUMMARY**

Regulation 8, Rule 51 was adopted in 1992 to implement a 1991 Clean Air Plan control measure and was intended to reduce volatile organic compound (VOC) emissions from adhesive and sealant use. The rule establishes VOC content limits for adhesives and sealants used by industrial and commercial facilities and by consumers. The major air districts in California have similar rules.

The limits in the rule went into effect in 1995. In 1994, 1996, and 1998, the BAAQMD Board of Directors adopted amendments to the rule's VOC limits to provide for greater statewide uniformity for the limits and to adjust several limits to the available technologies.

In 1999, EPA published in the Federal Register a limited approval and limited disapproval of the current rule. The EPA action made the rule part of the California State Implementation Plan (SIP), but required the correction by June 6, 2001 of aspects of the rule that do not conform to EPA policy. Many of the current proposed amendments are intended to make the rule fully approvable by EPA. In general, the amendments conform the District rule to a California Air Resources Board (ARB) model rule, which EPA has used as a template in determining approvability of the District rule.

In addition, several amendments are proposed to establish new adhesive categories and corresponding VOC limits to ensure that complying adhesives are available for certain narrow use categories. The new adhesive categories are:

- Perimeter Bonded Sheet Vinyl Flooring Installation
- Rubber Vulcanization Bonding
- Top and Trim Installation
- Immersible Product Manufacturing

The first two categories were included in the ARB model rule, though the rubber vulcanization category was defined differently in the ARB rule. The other two categories have been shown to be necessary through research conducted after the development of the ARB model rule.

The proposed amendments to the rule would exempt adhesives sold in handheld spray cans in favor of new, more stringent standards found in ARB's statewide consumer

products rule. These changes do not affect adhesives that are packaged in non-handheld pressurized canisters.

A number of other amendments are proposed to clarify rule language, eliminate redundancy, and provide for consistency throughout the rule.

The proposed amendments reduce the economic impacts of the rule while maintaining the emission reductions achieved. A CEQA initial study will be prepared for the proposed amendments.

## BACKGROUND

### Adhesives

Adhesives can be categorized in a number of different ways. One simple classification scheme divides them into four categories based on the manner in which the adhesive sets to achieve its bond:

- 1. Cooling of a thermoplastic:** Adhesives of this sort are thermoplastics which soften upon heating and harden again when cooled. They may be applied to a surface by liquefying a solid, coating with a powder which is later heated, extruding a semi-solid, or applying a hot solution. Simple examples of this sort of adhesive are paraffin, as used to seal an envelope, and asphalt, as used to bind road gravel. Common industrial adhesives in this category include ethylene vinyl acetate (EVA) and polyethylene hot melts.
- 2. Release of a solvent or carrier:** In adhesives of this sort, an adhesive material is dissolved in a solvent solution or water or carried by a water emulsion, called a *latex*. After substrates to be bonded have been wetted, the solvent or carrier evaporates, allowing the adhesive to set. Common examples of this type of adhesive are rubber cements and white glues. A common industrial adhesive in this category is contact adhesive.
- 3. Polymerization:** Adhesives of this sort form a solid by polymerization. The polymerization reaction may be triggered by the addition of heat, radiation, or a chemical catalyst, or through the exclusion of a reaction inhibitor. Common examples of this type of adhesive are epoxies and cyanoacrylates (instant glue or "crazy glue").
- 4. Application of pressure:** Unlike the other three categories, these adhesives do not undergo a change from liquid to solid in forming a bond. Instead, they are permanently tacky and bond when pressure is applied. Common examples are the adhesives used on adhesive tapes and sticky notes.

Of the four categories above, the one posing significant air quality issues is the second category, and specifically those adhesives within the category that cure by releasing an organic solvent to the atmosphere.

## **Regulation 8, Rule 51**

### ***Rule Background***

Regulation 8, Rule 51 was originally adopted by the Board on November 18, 1992 and implemented control measure A11 of the Bay Area 1991 Clean Air Plan. Most of the rule's volatile organic compound (VOC) limits took effect in 1995. The rule is intended to reduce VOC emissions from the use of adhesives, either by encouraging a shift from solvent-based adhesives to other types or through the reformulation of solvent-based adhesives. The Bay Area Base Year 1999 emission inventory prepared by the District in 2000 estimates that VOC emissions from adhesive use subject to the rule for 2000 were 8.9 tons per day. Most of the emission reductions from the rule have already occurred, as most of the VOC limits in the rule took effect in 1995.

### ***Rule Structure***

The rule applies to adhesives, sealants, and primers used by industrial facilities. It also applies to consumer use where the product is not subject to the California Air Resources Board consumer products regulation. The rule exempts extremely low-VOC products and products sold in small containers.

The rule contains two sets of standards. The first set, found in Section 301 of the rule, establishes VOC standards for various specific adhesive applications, such as flooring installation, roof installation, and tire retreading. The standard for a particular application is generally set at the VOC content of the lowest-VOC adhesive providing good performance for that application. However, because it was impossible to anticipate all adhesive applications, a second set of standards, found in Section 302, sets limits based on the type of materials being bonded. In addition, a small user exemption (Section 120) applies to this second set of standards, thus allowing use of special adhesives in special situations.

The VOC limits in the rule are stated in terms of the weight of VOCs, measured in grams, that are permitted in one liter of the adhesive or sealant product. The limits are written as "grams per liter" in the rule and are sometimes abbreviated in this report as "g/l."

### ***Rule Amendments***

This rule was significantly amended in 1994, 1996, and 1998 to add new adhesive or sealant categories or to alter VOC limits. Rule amendment activity for the rule has been driven largely by two things: (1) the need for statewide uniformity so that adhesive and

sealant products are treated relatively uniformly throughout the state, and (2) the need to adjust VOC limits for specific applications so that they can be met with available technologies.

From 1992 to 1998, the Adhesives Committee of the California Air Pollution Control Officers Association (CAPCOA) worked with the California Air Resources Board (ARB) to develop recommended VOC limits for adhesives. The final ARB recommendations are incorporated into an ARB document called *Determination of Reasonably Available Control Technology and Best Available Retrofit Control Technology for Adhesives and Sealants*, dated December 1998. Because this document, generally called the “RACT/BARCT determination,” was finalized a year after the most recent amendments to the District rule, there are minor differences between the rule and the RACT/BARCT determination. Most of those differences would be eliminated by the proposed amendments.

### ***EPA Limited Approval/Disapproval***

The current version of the rule, as amended by the Board in 1998, was submitted to EPA for inclusion in the California State Implementation Plan (SIP) for the federal ozone standard. On March 17, 1999, EPA published in the Federal Register as a proposed rule a limited approval and limited disapproval of Regulation 8, Rule 51. A technical support document listed EPA’s reasons for proposing to disapprove aspects of the rule. The BAAQMD sent a letter of response disagreeing with some of EPA’s rationale for the proposed action.

On November 4, 1999, EPA published in the Federal Register as a final rule the limited approval/disapproval of Regulation 8, Rule 51. In doing so, EPA dropped several of the deficiencies listed in the proposed rule as grounds for the action. As a result of the final limited approval/disapproval, the rule was made part of the SIP, but the aspects of the rule that EPA claims do not conform to its policies are required to be corrected within 18 months after the effective date of the Federal Register action. The effective date of the EPA action was December 6, 1999, so corrections must be made by June 6, 2001.

The deficiencies cited by EPA in its technical support document for the proposed rule fell into three primary areas: (1) departures from EPA recordkeeping requirements, (2) departures from EPA policy on director’s discretion, and (3) “deviations” of the rule’s VOC limits from what EPA has called federal RACT, based on the ARB RACT/BARCT determination. The deficiencies and their resolutions are listed below:

1. EPA comment: Section 501 should be revised to require daily recordkeeping for non-compliant coating use.

Response: **Rule changes made.** The proposed amendments add new language that EPA indicates is acceptable.

2. EPA comment: In violation of EPA policy, Section 501.4 allows discretion for the Executive Officer to approve alternative recordkeeping plans, thereby effectively changing SIP requirements.

Response: **Rule changes made.** The proposed amendments add new language that EPA indicates is acceptable.

- 3a. EPA comment: The plastic welding cement primers that are exempted under Section 121 are covered by the RACT/BARCT determination and are limited to 650 g/l.

Response: **Rule changes made.** Amendments are proposed to Section 121, which is to be deleted, and Section 301.3 to address this comment.

- 3b. EPA comment: The exemption found in Section 126 allows up to 20% of each facility's contact adhesive to meet a higher-than-RACT VOC limit; RACT is 250 g/l.

Response: **Comment dropped.** Based on the BAAQMD response to the proposed rule, EPA recognized that the RACT/BARCT determination identified RACT for contact adhesives as 540 g/l and dropped this comment in the final rule.

- 3c. EPA comment: The exemption in Section 127 for adhesives used to repair large tires does not appear in the RACT/BARCT determination and should not be allowed.

Response: **Comment dropped.** EPA accepted the justification presented by the BAAQMD for this exemption and dropped this comment in the final rule.

- 3d. EPA comment: The VOC limits in Section 301.1 for floor covering installation and multipurpose construction categories, which are both defined in the rule (Sections 209 and 212) to include ceramic tile, have VOC limits that exceed the RACT/BARCT determination separate limit of 130 g/l for ceramic tile installation.

Response: **Rule changes made.** Amendments are proposed to Sections 209, 212, 250, and 301.1 to address this comment.

- 3e. EPA comment: The VOC limit in Section 301.1 for multipurpose construction, which is defined in the rule (Section 212) to include cove base, has a VOC limit that exceeds the RACT/BARCT determination separate limit of 150 g/l for cove base installation.

Response: **Rule changes made.** Amendments are proposed to Sections 212, 251, and 301.1 to address this comment.

- 3f. EPA comment: The VOC limit in Section 301.3 of 550 g/l for pavement marking tape adhesive primers does not meet the RACT limit of 150 g/l.



Response: **Rule changes made.** An amendment to Section 301.3 is proposed to address this comment.

- 3g.** EPA comment: The VOC limit in Section 302 of 150 g/l for porous materials does not meet the RACT limit of 120 g/l.

Response: **Rule changes made.** An amendment to Section 302 is proposed to address this comment.

- 3h.** EPA comment: The VOC limit in Section 302 of 150 g/l for wood does not meet the RACT limit of 120 g/l.

Response: **Rule changes made.** An amendment to Section 302 is proposed to address this comment.

- 3i.** EPA comment: The VOC limit in Section 302 of 650 g/l for rubber does not meet the RACT limit of 250 g/l.

Response: **Rule changes made.** Amendments to Sections 255, 257, and 302 are proposed to address this comment.

- 3j.** EPA comment: The VOC limit in Section 304 for PVC welding sealant does not appear in the RACT/BARCT determination, and these sealants should be required to meet the RACT limit of 420 g/l for other sealants.

Response: **Rule changes made.** An amendment to Section 304 is proposed to address this comment.

In summary, all EPA concerns have been addressed in the proposed amendments. The District intends to submit the amended rule to EPA immediately after Board action. The District expects the rule to be fully approved into the California State Implementation Plan.

## **Purpose of Proposed Amendments**

The current proposed amendments do four things. First, they respond to EPA's limited approval and limited disapproval of the current rule as discussed above. Second, they exempt adhesives packaged in handheld spray cans in favor of new ARB statewide standards. Third, they add or modify a number of adhesive categories. Fourth, they clarify language throughout the rule. The following sections of this staff report discuss each proposed amendment. Where a section of the rule has been the subject of an EPA comment, that fact is noted.

# PROPOSED AMENDMENTS TO RULE

## Exemptions

### ***Section 8-51-111, Aerosol Product Exemption***

This section is amended to exempt handheld aerosol spray cans from coverage by the rule. Prior to 1995, the local air districts regulated industrial and commercial use of these products, while consumer uses were regulated under the ARB Consumer Products Rule found in Title 17 of the California Code of Regulations, beginning at Section 94507.

With passage of AB 1849 in 1996 (codified as Health and Safety Code Section 41712, subd. (h)), however, the aerosol adhesive standard in the ARB Consumer Products Rule was applied statewide, not just to consumer sales, but to all consumer, industrial, and commercial sale and use of aerosol adhesives. Air district regulation of these products was prohibited until 2000. This is the reason for the Section 111 exemption in the BAAQMD rule.

However, ARB has now adopted amendments to its aerosol adhesive standards that take effect in 2002 and that make them more stringent than the 75% VOC by weight standard in the current ARB and BAAQMD rules. The ARB amendments also prohibit the use of methylene chloride, perchloroethylene, and trichloroethylene in aerosol adhesives manufactured after January 1, 2002 for sale in California. Longstanding BAAQMD Board of Directors' policy has been to discourage product reformulations using toxic air contaminants such as these three compounds. Prior to the ARB amendments, the primary rationale for the BAAQMD to continue to regulate these products in 2000 was so that the BAAQMD standard, which treats the three compounds as VOCs, would effectively prohibit them.

Given the increased stringency of the ARB aerosol adhesive standards, it now makes sense for the BAAQMD rule to exempt aerosol adhesives in favor of the statewide ARB standards. Amendments to Sections 8-51-204 and 210 further clarify the rule's provisions regarding aerosol adhesives products. Amendments to Sections 8-51-226, 303, and 601 delete standards and other references to aerosol adhesives.

In effect, the exemption in Section 111 overlaps the exemption in Section 113. Section 113 exempts all adhesives subject to the ARB consumer products rule. The consumer products rule covers two types of adhesives: (1) aerosol adhesives and (2) small consumer-size containers (16 fluid ounces or 1 pound and smaller) of "contact adhesive," "construction, panel, and floor covering adhesive," and "general purpose adhesive." Because aerosol adhesives will be exempted under amended Section 111 and small

consumer-size containers will be exempted under amended Section 123 (see discussion below), Section 113 is currently redundant. Nevertheless, Section 113 will be retained because of the possibility that ARB may amend the consumer products rule in a way that would make the Section 113 exemption no longer redundant. By retaining the section, the District will avoid having to amend Regulation 8, Rule 51 if ARB takes such action.

### ***Section 8-51-117, Research and Development Exemption***

The reference to recordkeeping requirements for adhesives used in research and development, and therefore exempt from VOC limits, has been amended to clarify that facilities exempt under this section must only keep information identifying the adhesives used. Since the adhesives are not subject to VOC limits, facilities will not be required to maintain records of VOC content information.

### ***Section 8-51-120, Prohibition of Sale***

This section is being amended to clarify the prohibition against selling non-complying products as it applies to contact adhesives. An exemption for facilities that use small quantities of contact adhesive is included in Section 125. The prohibition of sale provisions are therefore amended to preclude the sale of any contact adhesive with a VOC content higher than the highest allowed in the rule.

### ***Section 8-51-121, Exemption of Plastic Welding Cement Primers***

(EPA Comment 3a)

This exemption for plastic welding primers is being deleted in order to impose the 650 g/l VOC standard listed in the RACT/BARCT determination.

### ***Section 8-51-123, Small Container Exemption***

Section 123 currently exempts adhesives sold in non-reusable packages that contain 8 fluid ounces or less. With the proposed amendments, this exemption would extend to adhesives in packages of 16 fluid ounces or 1 pound or smaller. This is the exemption level recommended in the ARB RACT/BARCT determination. The exemption in Section 123 overlaps current Section 113, which exempts products subject to the ARB consumer products rule, because the ARB rule covers small consumer-size containers (16 fluid ounces or 1 pound and smaller) of “contact adhesive,” “construction, panel, and floor covering adhesive,” and “general purpose adhesive.”

This change in the small container exemption will also make District enforcement of the rule easier. Under the current rule, many products sold in containers larger than 8 fluid ounces and less than 16 fluid ounces are not exempt under this section but are subject to the ARB consumer products rule and therefore exempt under Section 113. District inspectors must therefore review the ARB rule to determine whether the product is

subject to that rule or the District rule. With the proposed change, District inspectors need only look at the container size.

### ***Section 8-51-125, Contact Adhesive Limited Use Allowance***

This section formerly allowed to all users of contact adhesive a 10 gallon per month allowance for the use of higher-VOC contacts meeting a 540 gram per liter standard. The allowance was in effect until 2000 and allowed small shops to use the higher VOC products for that period. It also allowed larger facilities to use a small quantity of these adhesive. With the proposed amendments, only facilities using small quantities of contact adhesive would be able to use this exemption. The primary purpose of the amendment is to allow the purchase of brush-grade contact adhesive by facilities that must hand apply solvent-based adhesive with brush or roller. However, an adhesive would not have to be a brush-grade adhesive to qualify under this exemption. The VOC limit is set at 540 grams per liter since brush-grade adhesives are available at this VOC level but not at the rule's current 400 gram per liter and 250 gram per liter contact adhesive limits. Shops using more than 55 gallons per year would be required to meet the 250 gram per liter and 400 gram per liter contact adhesive limits in Section 301.4. Many of the air districts with adhesive rules have similar exemptions that typically apply to all adhesives, not just contact adhesives, and do not impose any VOC restrictions.

## **Definitions**

### ***Section 8-51-204, Aerosol Adhesive***

The proposed amendments to Section 204 would make the aerosol adhesive definition in the rule identical to the definition in the ARB consumer products rule.

### ***Section 8-51-209, Indoor Floor Covering Adhesive***

(EPA Comment 3d)

The term “ceramic tile” is proposed for deletion so that a separate VOC standard can be established for ceramic tile installation. See the discussion regarding Section 8-51-301.

### ***Section 8-51-210, Household Adhesive Product***

This term is no longer used in the rule and is proposed for deletion.

### ***Section 8-51-212, Multipurpose Construction***

(EPA Comments 3d, 3e)

The terms “ceramic tile” and “cove base” are proposed for deletion, as separate categories are proposed for adhesives used in installing these two materials.

#### ***Section 8-51-226, Volatile Organic Compound (VOC) Content***

This definition would be amended to delete references to aerosol adhesives. However, because VOC limits in the rule apply to adhesives supplied in larger pressurized containers (see the discussion under Section 308), HFC 152a, a common non-VOC propellant, has been added to the list of compounds that will not be considered VOCs in evaluating these products.

#### ***Section 8-51-229, ABS Welding***

This definition would be amended so that it is parallel to other categories in the rule, which refer to activities rather than to adhesives. The VOC limits in Section 301 apply to any adhesive used in a particular activity, not just one labeled or intended for the particular type of activity.

#### ***Section 8-51-232, CPVC Welding***

The term “PVC” is proposed for deletion from this definition because a separate definition (Section 252) is being proposed for “PVC welding.” There are separate VOC limits in the rule for CPVC and PVC welding adhesives. The definition also would also become parallel to other category definitions in the rule.

#### ***Section 8-51-239, Thin Metal Laminating***

At EPA’s suggestion, this definition would be amended so that it parallels the definition in the RACT/BARCT determination.

#### ***Section 8-51-241, Plastic Welding Adhesive***

Clarifying language is added to this definition.

#### ***Section 8-51-245, Metal to Elastomer Molding or Casting Adhesive***

This definition is proposed for deletion. This adhesive category is included in the RACT/BARCT determination. The RACT/BARCT determination also includes a category not found in the BAAQMD rule called “Sheet-Applied Rubber Installation.” Both categories involve the bonding of uncured rubber to another substrate through a vulcanization process. There are, however, a number of other applications of vulcanization bonding adhesives. In 2000, the San Joaquin Valley Unified APCD worked with manufacturers and users of these adhesives to craft language to describe an adhesive category that encompasses all vulcanization bonding. The two RACT/BARCT categories are subsets of this category. Recognizing that all vulcanization bonding

requires the same relatively-high VOC limit, the San Joaquin district set a VOC limit of 850 grams per liter for this category. As a result, a new category called “Rubber Vulcanization Bonding” is proposed for addition to the BAAQMD rule (Section 256). Because Metal to Elastomer Molding or Casting Adhesive is a subset of the new category, it is proposed for deletion.

#### ***Section 8-51-246, PVC Welding Sealant***

(EPA Comment 3j)

This definition was added to the rule in 1998 to allow for a specialty sealant used in the installation of vinyl windows. Because the largest containers that this product comes in are smaller than the new proposed small container exemption level of 16 ounces or 1 pound, there is no need for this category. It is proposed for deletion in response to the EPA disapproval.

#### ***Section 8-51-249, Contact Bond Adhesives – Special Substrates***

This definition would be amended to parallel the RACT/BARCT definition and the definitions used by other air districts.

#### ***Section 8-51-250, Bituminous Materials***

This definition was included in earlier drafts of the RACT/BARCT determination but not in the final document. The definition was used in describing the modified bituminous primer category that is proposed for deletion (see the following discussion).

#### ***Section 8-51-251, Modified Bitumen Primer***

This category was included in earlier drafts of the RACT/BARCT determination but not in the final document. These products are regulated under architectural coating rules, and the category is proposed for deletion.

#### ***Section 8-51-250 (new), Ceramic Tile Installation***

(EPA Comment 3d)

This category is included in the RACT/BARCT determination but not in the current District rule. These products are currently included under the “Floor Covering Installation” category, which has a VOC limit of 150 grams per liter. The new ceramic tile category has a proposed VOC limit of 130 grams per liter. The change from 150 g/l to 130 g/l will not affect products available as almost all products in this category have a VOC content that is below 130 g/l.

### ***Section 8-51-251 (new), Cove Base Installation***

(EPA Comment 3e)

This category is also included in the RACT/BARCT determination but not in the current District rule. These products are currently included under the “Multipurpose Construction” category, which has a VOC limit of 200 grams per liter. The new cove base category has a proposed VOC limit of 150 grams per liter. The change from 200 g/l to 150 g/l will not affect products available as almost all products in this category have a VOC content that is below 150 g/l.

### ***Section 8-51-252, PVC Welding***

This new definition is proposed because CPVC and PVC adhesives are currently defined in a single definition, even though the rule includes separate VOC limits for the two types of adhesive.

### ***Section 8-51-253, Perimeter Bonded Sheet Vinyl Flooring Installation***

The RACT/BARCT determination includes this category for which there is no corresponding category in the District rule. This new section would add the RACT/BARCT definition, and a new limit for the category is included in Section 301. With conventional sheet vinyl floor installation, sheet vinyl is bonded to plywood, particle board, or some other porous subfloor, and adhesive is spread over the entire surface to be bonded. With perimeter bonding, a new vinyl floor is bonded directly to the perimeter of an existing vinyl floor.

### ***Section 8-51-254, Top and Trim Installation***

The RACT/BARCT determination does not include this category. Top and trim installation is the installation in cars, boats, and airplanes of trim materials such as headliners, vinyl trim, dash covering, door covering, panel covering, etc. This new category is included because contact adhesives that meet the 250 g/l and 400 g/l limits in the District rule do not meet the requirements of this trade.

In late 2000, the District conducted extensive interviews with this trade after receiving complaints that new lower VOC solvent-based contact adhesives were not acceptable to the trade. The primary complaint was that the new contact adhesives did not have enough “open time,” the time period during which a bond can be made, and therefore did not allow enough time for the repositioning of materials that is typical of this work. A second common complaint was that the high solids content of the new adhesives made them so viscous that the adhesive spray pattern would show through the relatively thin fabrics used in top and trim work.

In the Bay Area and statewide, the primary use of contact adhesives is in the bonding of plastic laminates to wood composites in making countertops and furniture. There are thousands of Bay Area users in this category, from homeowners and building contractors fabricating countertops in homes, to local kitchen and bath cabinet shops, to fixture and countertop manufacturers serving regional and national markets. The limits in the District rule and the RACT/BARCT determination are based on this use of contact adhesives.

Contact adhesives are based on an elastomeric polymer, which may be natural rubber or a synthetic rubber, carried in a solvent solution or in water as a latex. Contact adhesives are applied to both surfaces to be joined. After the carrier evaporates, the two surfaces are brought together and the adhesive bonds to itself. In cabinet work, an instantaneous and non-repositionable bond is desired. The definition of contact adhesive, both in the District rule and the RACT/BARCT determination, are based on these characteristics.

In trim work, flexible vinyls and other fabrics are applied to complex curved surfaces by hand. As fabric is wrapped over these complex surfaces, wrinkles or bubbles in the fabric surface must be corrected. To make these corrections, fabrics are lifted, stretched, and repositioned until a smooth surface is obtained. This lifting of bonded fabric materials is possible because the separating force need only overcome the force holding the materials together along the thin line of separation as fabrics are peeled apart. With rigid materials, any force to separate materials would have to overcome the bond holding most of the bonded surface together. Rigid materials are generally destroyed before this can occur.

After a top and trim fabric is bonded and then separated to correct imperfections, the contact adhesives traditionally used by this trade will then “grab” again when the fabric is smoothed back down over the surface to which it is being bonded. However, if the open time of the adhesive is exceeded during this process, the adhesive will not grab a second or third time.

Thus the primary requirements for contact adhesives used in top and trim work are that they have extended open time to permit initial positioning and that they allow subsequent repositioning. These characteristics are entirely different from those important to the cabinet trade on which the contact adhesive standards are based. The new high solids contact adhesives developed for the cabinet trade contain much less solvent that must evaporate before the glue is ready to bond, and much lower “open time” during which a bond must be made. For example, Wilsonart’s Lokweld 830, with a solids content of 36% by weight and a VOC content of 390 grams per liter, is ready to bond in 3-5 minutes, and the bond must be completed within 15 minutes. In contrast, TACC’s Con-Bond 2965, with a solids content of 24% by weight and a VOC content of 540 grams per liter, is ready to bond in 5 minutes, but bonds can be made for up to an hour. The Wilsonart product has a viscosity of 1140 centipoise, making it a great deal more viscous than the TACC product, which has a viscosity of 160 centipoise. This difference in viscosity accounts for the tendency of higher solids products to “telegraph” their spray pattern through thin fabrics.



Though top and trim adhesives are contact adhesives, the term “contact bond adhesive” is defined in the regulation (Section 8-51-242) as being characterized by “instantaneous, non-repositionable bonds.” When used in the manner typical of the top and trim trade, contact adhesives do not meet this definition, since repositioning is common. Because the current regulation and the RACT/BARCT determination did not contemplate this use of contact adhesive or establish appropriate VOC limits for the use, a new definition and category are proposed for addition to the rule. A VOC limit of 540 grams per liter for the category is also proposed for addition to Section 8-51-301, since this is the lowest VOC at which available adhesives still have the characteristics necessary for this trade.

In researching this issue, the District conducted discussions with approximately 20 top and trim shop owners. Virtually all shops are extremely small businesses that use from 20 to 60 gallons of adhesive per year. Distributors to the trade have estimated that there are approximately 200 of these businesses in the nine county Bay Area. The District contacted the three Bay Area distributors that sell adhesive to this trade and found that annual adhesive sales in 2000 were approximately 9000 gallons. This represents approximately 15% of contact adhesive sales to the cabinet trade.

#### ***Section 8-51-255, Immersible Product Manufacturing***

The VOC limit in Section 8-51-302 for bonding pre-formed rubber products is being reduced by these amendments from 650 grams per liter to 250 grams per liter. In order to make this change possible while still allowing the use of higher-VOC products required in the bonding of certain immersible products, this category is proposed for addition to the rule. Other California adhesive rules contain similar categories. The Ventura County APCD rule simply exempts this use from the rule, while the San Diego County APCD rule sets a limit of 750 grams per liter. The limit proposed for this new category in the BAAQMD rule is 650 grams per liter, reflecting the fact that Bay Area manufacturers of these products have been able to stay within the current 650 gram per liter limit for rubber bonding. This new VOC limit is also proposed for addition to Section 301.

#### ***Section 8-51-256, Rubber Vulcanization Bonding***

This new category is being added to subsume an existing category in the rule (“Metal to Elastomer Molding or Casting Adhesive”) and a category in the RACT/BARCT determination that has not yet been included in the BAAQMD rule (“Sheet Applied Rubber Installation”). For additional information, see the discussion regarding 245 above.

### ***Section 8-51-257, Pre-formed Rubber Product***

(EPA Comment 3i)

This definition is proposed for addition to clarify that the rubber substrate limit in Section 302 applies to pre-formed rubber products and not to rubber vulcanization bonding.

## **Standards**

### ***Section 8-51-301.1, Architectural Adhesive Products***

(EPA Comments 3d, 3e)

New VOC limits are added for three categories: ceramic tile installation, cove base installation, perimeter bonded sheet vinyl flooring installation. The VOC limits are those from the RACT / BARCT document.

The ceramic tile category currently falls under the “floor covering installation” category, which has a VOC limit of 150 grams per liter. The amendments would put this use in a separate category with a VOC limit of 130 grams per liter. This change should produce minimal emission reduction and market impacts because District research indicates that most available products already comply with the proposed new limit.

The cove base installation category currently falls under the “multipurpose construction” category, which has a VOC limit of 200 grams per liter. The amendments would put this use in a separate category with a VOC limit of 150 grams per liter. This change will also produce minimal impacts because most available products comply with the proposed new limit.

The new perimeter bonded sheet vinyl flooring installation category establishes a VOC limit of 660 grams per liter for the installation of new sheet vinyl flooring over an existing vinyl floor. Because vinyl-to-vinyl bonding requires solvent-based adhesive, the proposed VOC limit, equivalent to that in the RACT/BARCT determination, is higher than that for conventional sheet vinyl flooring installation. This higher limit will produce no emissions impact, however, because the area bonded is so much smaller than in a conventional installation.

### ***Section 8-51-301.2, Specialty Adhesive Products***

New VOC limits are proposed for three new categories: rubber vulcanization bonding, immersible product manufacturing, and top and trim installation. Each of these new categories was discussed above under the definitions section.

The proposed VOC limit of 850 grams per liter for rubber vulcanization bonding is equivalent to those for the two categories it subsumes (see the discussion regarding Section 245 above).

The VOC limit of 650 grams per liter for immersible product manufacturing is equivalent to the existing rubber substrate limit in Section 302 (see the discussion regarding Section 255 above).

The VOC limit of 540 grams per liter for top and trim installation is set at the lowest VOC level at which adhesives possess the characteristics required by this trade (see the discussion regarding Section 254 above).

### ***Section 8-51-301.3, Adhesive Primers***

(EPA Comment 3f)

A new VOC limit is proposed for pavement marking tape primer. This new limit of 150 grams per liter replaces the existing limit of 550 grams per liter.

The existing category of “modified bitumen primer” is proposed for deletion. This category was included in a draft of the RACT/BARCT determination but not in the final document. These products are regulated under architectural coating rules.

A new category and limit are added for “plastic welding primer.” These products were formerly exempted from the rule. The new VOC limit is 650 grams per liter, which is equivalent to the RACT/BARCT limit.

### ***Section 8-51-301.4, Contact Bond Adhesive***

Compliance dates that have already passed are proposed for deletion.

### ***Section 8-51-302, Adhesive Product, Substrate Limits***

(EPA Comments 3g, 3h, 3i)

The VOC limits for porous materials and wood are proposed to be slightly reduced (from 150 grams per liter to 120 grams per liter) to conform to the RACT/BARCT determination limits. This change should have little effect on products available or emissions because most currently complying products already meet the lower VOC limit.

The category label for “Rubber” is revised to “Pre-formed Rubber Products.” The VOC limit is proposed to be reduced from 650 grams per liter to 250 grams per liter. For a discussion of the reasons for these changes, see the discussions above regarding Sections 245, 256, and 257.

### ***Section 8-51-303, Aerosol Adhesive Spray Product Limit***

This section is proposed for deletion in favor of the standards in the ARB consumer products regulation (see the discussion regarding Section 111).

### ***Section 8-51-304, Sealant Product Limits***

The “PVC Welding” sealant category is proposed for deletion because products for which this category was created in 1998 would be exempt under the proposed amendment to the small container exemption.

### ***Section 8-51-308, Limits for Pressurized Containers***

The rule continues to apply to adhesives packaged in pressurized containers, and this new section is intended to make this clear. These containers do not meet the definition of “aerosol adhesive” found in Section 204 of this rule, which is the same definition found in the ARB consumer products rule. The containers are not handheld, they are generally refillable, and the use of “ancillary hoses or spray equipment” is required. Because these containers typically combine a conventional adhesive with a VOC propellant, they produce higher VOC emissions than conventional adhesives applied with spray equipment. The gram-per-liter standards in the rule are applied to these pressurized canisters by treating the entire product as a liquid, since the propellants, under pressure, are liquids. Amendments to Section 226, the VOC definition, are proposed so that HFC-152a, a common non-VOC propellant, is not treated as a VOC in evaluating these products.

## **Administrative Requirements**

### ***Section 8-51-402, Labeling Requirements***

This section is proposed for amendment to clarify that the VOC content that is to be displayed on labels is the same “VOC content” defined in the regulation.

## **Monitoring and Records**

### ***Section 8-51-501.2, Recordkeeping***

(EPA Comment 1)

EPA’s limited disapproval stated that this section should require daily recordkeeping for use of non-complying adhesives. The authority for the EPA daily recordkeeping policy is found in EPA’s Federal Register notice of November 24, 1987, which announced requirements for rules that are included in state implementation plans (SIP) for areas that

have not attained the federal ozone standard. Pursuant to Section 182 the federal Clean Air Act, these rules are required to impose reasonably available control technology (RACT) on sources. The Federal Register notice states that recordkeeping should be commensurate with compliance timeframes, and, for example, a requirement stated in terms of a daily emission rate requires daily recordkeeping. The notice also clearly states that the recordkeeping and other RACT requirements apply to “CTG sources” and non-CTG sources with a potential to emit more than 100 tons per year. Pursuant to a mandate in the federal Clean Air Act, EPA develops Control Techniques Guidelines or CTGs in which it establishes federal controls that are considered to be reasonably available control technology (RACT) for the sources to which the CTG applies.

The Federal Register notice and EPA policy documents make it clear that RACT requirements, in most cases, apply to facilities that are above what is called the “CTG cutoff.” The CTGs typically establish a floor or exemption level below which the RACT requirements do not apply. For CTGs that do not establish a cutoff, EPA guidance states that the cutoff should be actual emissions of 15 pounds per day or 3 pounds per hour, or potential emissions of 10 tons per year.

To accommodate EPA’s concerns about recordkeeping, a new Section 501.3 is proposed and would require daily recordkeeping for use of non-complying coatings for facilities with emissions greater than 330 pounds per month. This figure was derived from EPA’s general CTG cutoff of 15 pounds per day multiplied by 22 days, which represents the typical work month for the type of facilities regulated by this rule. The work month determination comes from an 1999 analysis by a South Coast AQMD recordkeeping work group that included representatives from ARB and EPA. EPA has indicated that the proposed language addresses their concerns.

Non-complying coatings may be used by facilities pursuant to a low usage exemption in Section 114. The new Section 501.3 would require facilities with emissions over 330 pounds per month to track adhesive use allowed under Section 114 on a daily basis. To put some perspective on the 330 pound cutoff, a common solvent-based contact adhesive that complies with the rule’s VOC standards emits 1.8 pounds of VOC emissions per gallon of adhesive used, a fact that can be determined from the technical data sheet or material safety data sheet (MSDS) for the adhesive. A facility that uses this adhesive would have to use 183 gallons of adhesive per month before it would be required to keep daily track of minor usage of non-complying products. This level of usage would be found in a large shop, for which daily rather than monthly recordkeeping is more appropriate.

## ***Section 8-51-502 (formerly 501.4), Alternative Recordkeeping Plans***

(EPA Comment 1)

Section 501.4 was added to the rule in 1994 to accommodate four Bay Area research and development facilities (Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, Sandia National Laboratories, and the Stanford Linear Accelerator) that have computer-based recordkeeping systems that track all products brought into the facilities through the use of bar codes applied to each can or other container. The alternative recordkeeping plans that the facilities have developed apply only to adhesive and sealant use by maintenance personnel.

This language of this section was modified in 1998 to address EPA comments received when the rule was amended in 1996. EPA requested that the language more clearly specify what types of facilities are subject to the alternative recordkeeping provisions and what criteria must be met for approval of a plan. Though the language was modified in response to the EPA concerns, EPA indicated in its final approval/disapproval that the plan approval provisions vest the Executive Officer with discretion to change SIP requirements. This “director’s discretion” violates EPA policy. In addition, EPA indicated in the approval/disapproval that the presumption of violation in section 8-51-501.4e should be changed to a presumption of daily violation. Staff has discussed these issues extensively with EPA staff, and the proposed amendments incorporate language that EPA has indicated is acceptable and move the requirements to a new Section 502.

## **Manual of Procedures**

### ***Section 8-51-601, Analysis of Samples***

This section is proposed to be modified to delete references to aerosol adhesives.

### ***Section 8-51-603, Analysis of Plastic Welding Adhesives***

This section is also amended to ensure consistency of terms.

## **EMISSIONS AND EMISSION REDUCTIONS**

### **Emission Reductions Achieved by the Rule**

The BAAQMD base year 1996 emissions inventory showed 1996 uncontrolled adhesive VOC emissions to be 17.45 tons per day and controlled emissions to be 11.15 tons per day. The emission reduction attributable to the rule was therefore 6.3 tons per day in

1996. The base year 1999 emissions inventory shows 2000 controlled emissions to be 8.9 tons per day.

## **Emission Impacts of the Proposed Amendments**

The proposed amendments impose more stringent VOC limits for the following categories:

- Ceramic tile installation
- Cove base installation
- Plastic welding primer
- Porous materials
- Wood
- Pre-formed Rubber Products
- PVC Welding Sealants (category eliminated)

Little sales information is available for these categories other than for plastic welding primers. For the Bay Area, estimated usage in the plastic welding primer category is 120 gallons per day. Products are available to meet the proposed 650 gram per liter limit, while current products have an average VOC content of 850 grams per liter. The emission reduction in going to low-VOC primers is therefore approximately 200 pounds per day or 0.1 tons per day. Some minor emission reduction would be achieved in changing the rubber substrate limit from 650 grams per liter to 250 grams per liter, but most emissions in this category occur in operations that will be subject to the higher-VOC vulcanization bonding and immersible product limits. In the other categories, no significant emission reductions are expected because most existing products already comply with the proposed new limits. As a result, these more stringent limits will produce an emission reduction of approximately 0.1 tons per day.

The proposed amendments make changes (generally category definitional changes) that maintain current limits for the following categories:

- Immersible Product Manufacturing
- Metal to Elastomer Molding or Casting

These changes are expected to produce no net change in emissions.

The proposed amendments delete current limits for aerosol adhesives in favor of new, more stringent ARB limits. In the short term, this amendment produces no net change in emissions, but after 2002 will produce emission reductions. Those reductions, however, are not included in this analysis because the ARB rule originally included a future 25% VOC by weight limit for which credit was granted in the state implementation plan (SIP). Because the new ARB limits are not as stringent as the 25% VOC limit, which was found to be infeasible, the new limits produced a SIP VOC reduction shortfall. ARB has accounted for this shortfall through other emission reductions.

The proposed amendments make changes that result in less stringent limits for the following categories:

- Top and Trim Adhesive
- Small Users of Contact Adhesive

Top and trim operations would, but for the addition of this new category, be subject to the 400g/l contact adhesive-special substrates limit. The proposed new category has a limit of 540 g/l. Based on sales information from distributors to this trade, daily usage of adhesive by the trade is 35 gallons per day. The emission increase associated with the addition of the top and trim category is therefore 41 pounds per day, or 0.02 tons per day.

The exemption in Section 125 allows small cabinet shops that use no more than 55 gallons of contact adhesive per year to use 540 g/l adhesive rather than the 400 g/l or 250 g/l adhesives otherwise required by Section 301.4. The District's 1997 survey of the cabinet trade showed that small shops that use less than 5 gallons of adhesive per month account for about 6% of adhesive use, or about 10 gallons of adhesive per day. Assuming conservatively that, but for the exemption, all this adhesive would be required to meet the 250 g/l limit, the emission increase associated with the exemption is 24 pounds per day, or 0.01 tons per day.

Overall, the amendments are expected to maintain current emission reductions or produce minor additional emission reductions of about 0.07 tons per day.

## **ECONOMIC IMPACTS**

### **Socioeconomic Impacts**

The socioeconomic impacts of these amendments are expected to be beneficial. In general, the proposed amendments modestly adjust certain VOC limits in the regulation to those in the RACT/BARCT determination. Even though most of these adjustments make VOC limits somewhat more stringent, most products in these categories already meet the new limits. In addition, these limits are in effect in most other areas of northern California, and products that meet the limits are being supplied and stocked throughout the region. In addition, the proposed amendments create several new categories, primarily to allow the continued use of higher VOC products necessary in various rubber bonding operations. These changes minimize the impacts of a more stringent VOC limit for general rubber bonding. As a result, these limits cannot be said to "significantly affect air quality or emission limitations," and the District has therefore not prepared the socioeconomic analysis that would otherwise be required under Section 40728.5 of the Health and Safety Code.



## **Incremental Costs**

Under Health and Safety Code Section 40920.6, the District is required to perform an incremental cost analysis for a proposed rule under certain circumstances. To perform this analysis, the District must (1) identify one or more control options achieving the emission reduction objectives for the proposed rule, (2) determine the cost effectiveness for each option, and (3) calculate the incremental cost effectiveness for each option. To determine incremental costs, the District must “calculate the difference in the dollar costs divided by the difference in the emission reduction potentials between each progressively more stringent potential control option as compared to the next less expensive control option.” Because these amendments are not expected to increase costs and because the District can identify no other control options that meet the emission reduction and policy aims of this proposal, no incremental cost analysis has been prepared.

## **ENVIRONMENTAL IMPACTS**

Pursuant to the California Environmental Quality Act, the District prepared an initial study for the proposed amendments to Regulation 8, Rule 51. The initial study concluded that the proposed amendments would not result in any significant environmental impacts. As a result, a CEQA negative declaration is proposed for adoption by the Board in connection with the amendments.

## **REGULATORY IMPACTS**

Section 40727.2 of the Health and Safety Code requires an air district, in adopting, amending, or repealing an air district regulation, to identify existing federal and district air pollution control requirements for the equipment or source type affected by the proposed change in district rules. The district must then note any differences between these existing requirements and the requirements imposed by the proposed change. Where the district proposal does not impose a new standard, make an existing standard more stringent, or impose new or more stringent administrative requirements, the district may simply note this fact and avoid the analysis otherwise required by the bill.

These proposed amendments to Regulation 8, Rule 51 do impose a slightly more stringent standard for some categories. As noted above, these limits are already met by the products currently on the market. The remaining amendments do not impose more stringent requirements and are therefore exempt from analysis under the new legislation. For these amendments, however, there are no comparable federal or district standards for the VOC content of adhesives. To comply with Health and Safety Code Section 40727.2, the District therefore simply notes that no other federal or District standards apply.

## RULE DEVELOPMENT HISTORY

Beginning in late 2000, the District discussed proposed amendments to the rule with industry, and particularly with those in the automotive top and trim trade who were having difficulties in using low-VOC solvent-based contact adhesives. In addition, the District discussed with EPA the concerns EPA had expressed in the Federal Register notice giving the rule a limited approval / limited disapproval. The District also discussed proposed recordkeeping language with the national laboratories. Through these discussions, the District developed language that addressed the EPA and industry concerns while still preserving the rule's emission reductions.

On March 12, 2001, the District conducted a workshop on proposed amendments to the rule. Both the Air Resources Board and EPA indicated that they had no comments or concerns regarding the proposal. The workshop was attended by approximately ten people, about half of whom represented the top and trim trade, with adhesive manufacturers, the National Paint and Coatings Association, and the national laboratories also represented. At the workshop, participants supported the proposed amendments and suggested a few minor changes in language, all of which have been incorporated into the proposed amendments.

## COMMENTS AND RESPONSES ON WORKSHOP DRAFT

- 1. The inclusion of the proposed new category of "rubber vulcanization bonding" as defined in Section 256 has the potential to relax current requirements for tire retreading if a tire retreading process called "hot capping" could be said to be included within this category. The current definition of tire retreading in Section 240 should be revised to make it clear that tire retreading includes hot capping. <E-mail from Bandag, Inc. 2/16/01>**

*Both the existing definition of tire retreading in Section 240 and the new definition of rubber vulcanization bonding in Section 256 have been modified to ensure that the tire retreading standards are not relaxed.*

- 2. The California Air Resources Board has no comments or suggestions for improvement on the workshop draft. <E-mail from CARB. 3/6/01>**

*Comment noted.*

- 3. The exemption in Section 113 for adhesives subject to the ARB consumer products regulation should not be deleted as proposed even though it is currently redundant given the exemptions in Sections 111**

**and 123. ARB may amend the consumer products regulation in the future so that the exemption would not be redundant. Keeping it in the rule would allow the District to avoid having to amend its rule if ARB makes such a change. <Irish, National Paint and Coatings Association (NPCA). Workshop comment. 3/12/01>**

*The exemption in Section 113 has been retained in the final draft rule.*

- 4. The national laboratories employ thousand of researchers using extremely small quantities of adhesives in research and development activities. The current exemption in Section 117 requires extensive recordkeeping for these adhesives, yet their use is entirely exempt. Given the great difficulty in obtaining VOC content information on these adhesives from small specialty manufacturers, this imposes an enormous recordkeeping burden that is not justifiable. <Lawrence Livermore National Laboratory, Sandia National Laboratories, Stanford Linear Accelerator. Workshop comment. 3/12/01.>**

*The District has examined the nature of this adhesive use and agrees that, since there are no standards that the research and development adhesives must meet, requiring VOC content data makes little sense. Most of the adhesives appear to be extremely small containers of structural adhesives like cyanocrylates and epoxies that have inherently low emissions. In order to retain some ability to examine these emissions should it ever be necessary, Section 117 has been amended to require only that the names of the adhesives be retained by the labs. Should it ever need to do so, the District would be able to obtain VOC information on these products.*

- 5. The Northern California Upholsterer's Association supports the inclusion of the top and trim installation category. <Annereau, Northern California Upholsterer's Association. Letter. 3/13/01>**

*Comment noted.*

## **CONCLUSION**

The proposed amendments to Regulation 8, Rule 51 are intended to correct rule deficiencies noted by EPA in their limited approval / limited disapproval (64 Fed. Reg. 60109) of the 1998 version of the rule. The amendments also establish several new adhesive categories and corresponding VOC limits to ensure that complying adhesives are available for certain narrow use categories. In addition, the amendments exempt adhesives sold in handheld spray cans in favor of new, more stringent standards found in ARB's statewide consumer products rule. Finally, the amendments clarify language throughout the rule.

Pursuant to Section 40727 of the California Health and Safety Code, regulatory amendments must meet findings of necessity, authority, clarity, consistency, non-duplication, and reference. The proposed amendments are:

- Necessary to limit emissions of volatile organic compounds, a primary precursor to urban ozone formation, and to ensure compliance with EPA requirements;
- Authorized by Sections 40000, 40001, 40702, and 40725 through 40728 of the California Health and Safety Code;
- Written or displayed so that meaning of the amendments can be easily understood by the persons directly affected by them;
- Consistent with other District rules, and not in conflict with state or federal law;
- Non-duplicative of other statutes, rules, or regulations; and
- Are implementing, interpreting, or making specific the provisions of California Health and Safety Code Sections 40000 and 40702.



**APPENDIX: EPA FEDERAL REGISTER  
NOTICE (64 FED. REG. 60109)**